

The Resource

for Environmental Education in Missouri

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Saving the World 101

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Missouri Department of Conservation

"We all need to work together to save the world," wrote a teacher who had just completed a water quality workshop presented by the Conservation Department.

Most people don't wake up in the morning with the intent to "save the world." It's a tall task for any individual to shoulder by himself. But collectively, whether at the grade school, community, state or national level, individuals can move mountains -- or, more importantly, save mountains.

The Conservation Department believes strongly in the power of individuals to save the world. And the first step, what we might think of as "Saving the World 101," is the power of education.

I'm often called upon to explain Conservation Department education programs to resource managers. They are the ones who are doing the work "on the ground" to save the world, one acre at a time. I like to point out to them that the greatest potential for saving habitat lies in the human mind. It is humans who make their work possible; humans who support -- or not -- the concepts of conservation; humans who make decisions and form values about the land and its uses.

As educators, you have the potential for saving the world, one human mind at a time. When I was a junior high school student, I had an algebra teacher with a wide-ranging curiosity about the natural world. He took us to visit a planetarium. He spent an entire class talking about the beneficial qualities of snakes. He explained how number patterns occur commonly in nature. His information imbued us with respect for nature, and his enthusiasm provided an emotional link to the wonders around us.

It takes many avenues to connect people with nature. That's why the Conservation Department uses venues as diverse as "Babes in the Woods" nature center programs for toddlers to "Advanced Archery for Adults" in our outdoor skills training. As you read this issue of "The Resource," we hope you'll see the variety and scope of educational endeavors available to teach conservation. And we hope you'll find one or some that help you do your job while saving the world.

What's in it for you?



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**An entire issue devoted to
MDC Education Resources**

Aquatic Education Resources

One Fish, Two Fish, Red Fish, More Fish!

Fish On Wheels

What if you could put your students down below the surface of a lake or river, face to face with Missouri's fishes? Now there's a way – without even getting wet. The Show-Me Missouri Fish Mobile Aquarium is coming to a fair, shopping mall, or special event near you.

This 3,200-gallon, 30-foot-long, self-contained lake on wheels displays an average of 70 fish in a cut-away slice of the underwater world. Come and see some of the more popular sport and game fish, along with fish rarely seen by most people. As many as 25 different species, from bluegill to flathead catfish to long-nosed gar, swim at eye level along a natural setting of rocks, logs, and plants. Your students will be fascinated with the sight of these ordinarily inaccessible creatures close up.

Fisheries biologists and professional anglers demonstrate fishing tips and techniques from atop the mobile aquarium as they discuss the ecology of fish and how seasonal behavior, distribution, and habitats relate to recreational fishing. Ask about using the fishing simulators or the kids' casting game to add hands-on activities to this exciting learning experience. The Show-Me Missouri Fish Mobile Aquarium is an awe-inspiring exhibit that entices onlookers to get excited about fish and fishing.

Hatching Fish

What are we doing to restore sportfish populations in Missouri? How do fish spawn? What do fisheries biologists do? Why do we stock fish in lakes and ponds? These are some of the questions that will be answered on a tour of your local fish hatchery. In addition, most hatcheries have a public fishing lake, display fish in an aquarium, and demonstrate water quality and conservation practices.

Programs are available that educate visitors about Missouri fish species, pond management, fisheries management and the general characteristics of fish. The state's newest hatchery, Lost Valley in Warsaw, boasts a 12,700 gallon aquarium containing Missouri fish species, exhibits highlighting facts about the hatchery, and a fishing pond stocked with hybrid sunfish and channel catfish. Two large windows offer a view of the fish production area where work can be observed and staff is available to answer questions and explain equipment and procedures. Call the hatchery nearest you to schedule a program.

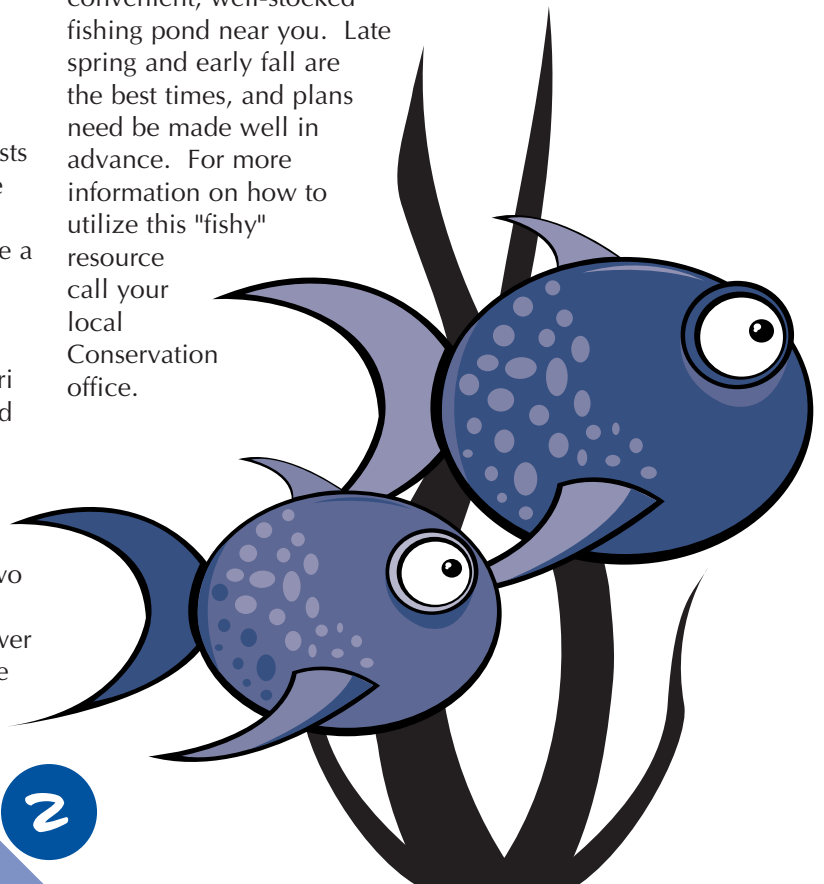
Let's Go Fishing!

Rigging poles,
Baiting, casting, un-
Tangling lines, taking fish off.
Keep or release, just
Go fishing.

Haiku is one way to teach kids about aquatic resources but an even better way is to actually take them fishing. Get your students excited about life in and around the water through this hands-on, up-close, fun activity.

Our Kids' Fishing Clinics can be tailored to meet your educational needs. Keyed to current Show-Me Standards, this multi-disciplinary program is adaptable across the curriculum for grades four through eight. Topics covered include the water cycle, land uses, water pollution, food webs, aquatic ecosystems, fish anatomy, water quality, and more. Plenty of in-classroom support materials are available to build knowledge and excitement before the fishing experience and to enrich post-activity learning. Guaranteed your students will talk about their experience well after the event.

We provide all the equipment needed, and there is a safe, convenient, well-stocked fishing pond near you. Late spring and early fall are the best times, and plans need be made well in advance. For more information on how to utilize this "fishy" resource call your local Conservation office.



Classrooms Beyond the Walls

Show-Me Conservation Outdoor Classroom Grants

Look at your schoolyard through the eyes of a student. Is it diverse, exciting and filled with a variety of different habitats and wildlife? Or is it a monotonous sea of grass and blacktop?

Young, growing minds thrive in an environment that supports a diversity of plants and wildlife. By adding an outdoor classroom to your school site students can have real-life learning experiences as they participate in hands-on, experiential based instruction in the out-of-doors. Outdoor classrooms can be used to supplement lessons ranging from art and biology to math and social studies while addressing a diverse collection of learning styles. An outdoor classroom inspires learning on the part of the students, provides alternatives to standard classroom studies, and enhances the aesthetic quality of the schoolyard.

The Show-Me Conservation Outdoor Classroom Grant offers two types of grants for schools. A Development Grant provides up to \$2,500 per project. Intended for large projects that focus on the development or extension of outdoor learning areas, this grant requires a 20% match from the school, district, or community. An Enhancement Grant provides up to \$500 per project. Intended for smaller projects such as the development of a butterfly garden or enhancement of an existing site, this grant does not require a match.

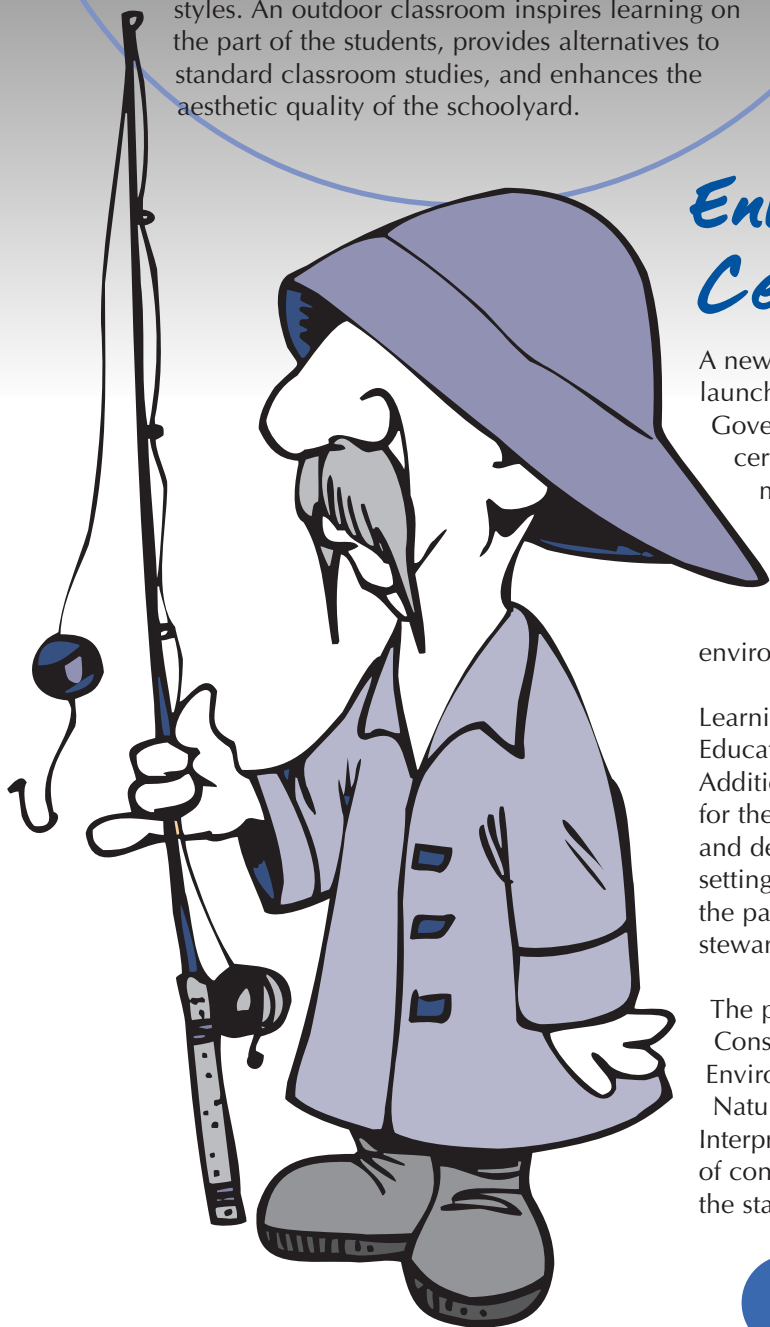
Grant packets containing a request for supplemental resources are mailed to school principals in the fall. Grants are due in early May with notification occurring in June. If you are interested in developing an outdoor classroom at your school contact your local Conservation Education Consultant.

Environmental Education Certification Program

A new Environmental Education Certification program has been launched in Missouri. Based on recommendations from the 1994 Governor's Task Force on Environmental Education this voluntary certification program constitutes acknowledgment that an educator meets certain minimum preparation, professional experience and continuing education in conservation and environmental education. The process of becoming certified and maintaining the designation requires the completion of a set number of hours in five categories covering learning, teaching and environmental action.

Learning categories include Instructional Workshops, Environmental Education Experiences in the Out-of-Doors, and Knowledge of Additional Environmental Education Resources and Facilities. Hours for the Teaching category are completed through the development and delivery of three distinct lessons in either a formal or non-formal setting. The "action partnership" component demonstrates the effect of the participant's environmental education through leadership, stewardship and action.

The program is sponsored by the Missouri Department of Conservation Office of Environmental Education, the Missouri Environmental Education Association, the state Department of Natural Resources, and endorsed by the Association of Missouri Interpreters. It has been designed to take advantage of the rich array of conservation and environmental education resources available in the state.



Places to Go & Things to Do

Conservation *Centers*

The Department operates four community nature centers and several visitor centers. They include Powder Valley Conservation Nature Center (CNC) in Kirkwood, near St. Louis; Burr Oak Woods CNC in Blue Springs, near Kansas City; Runge CNC in Jefferson City; the Springfield CNC in Springfield; Rockwoods Reservation in Eureka, near St. Louis; the August A. Busch Memorial Conservation Area in St. Charles; and the Conservation Center at the Shepherd of the Hills Hatchery Visitors Center near Branson.

These sites offer a variety of fun, educational conservation-related programs to families, school groups, youth groups, adults (including teachers) and other audiences. School programs offered are age-specific and correlated to the Show-Me Standards. Most programs include hands-on activities and often, a guided hike out-doors.

Each site also offers special events several times throughout the year. While these are geared toward families, they provide excellent education opportunities and you may want to encourage your students to participate with their parents. Examples of events include Holiday Array, held at Runge CNC during the Christmas holiday; Wetlands for Kids and Kids Fishing Fair at Busch Memorial CA; Vulture Venture, held at the Shepherd of the Hills Hatchery Conservation Center in the winter, a prime viewing time for the black vultures that winter there; Insect-O-Rama and Halloween Happenings, held annually at the Springfield CNC. An easy way to keep up to date about events and programs at the nature center near you is to be on their newsletter mailing list. For more information contact the center of your choice or stop in for a visit. You'll be glad you did!

Wildlife *on Stage*

The Department of Conservation offers several unique educational opportunities and events highlighting native wildlife and their habitat. Listed below are a few of the more popular programs.

Awesome Otters - Two live, playful river otters accompany Glenn Chambers in a program about river otters and their restoration to Missouri. Program participants learn about otter habits, habitat, biology and restoration efforts while watching the otters swim in a

clear tank. Programs are available on a limited basis to groups of 100 or more, at no charge.

Critter Calls - Imagine being able to talk to a barred owl, a turkey, even a fox. Ralph Duren can do just that. A master of animal calls, Ralph imitates the calls of many Missouri birds, mammals, even amphibians. Ralph's "Call of the Wild" program is available to groups of 100 or more, and is free of charge.

Eyeing Eagles - Eagle Days events are held for the public several times each winter in locations across the state. Featuring exhibits, films, and live bald eagles these events take place in areas populated by wintering bald eagles. Participants are treated to excellent wild eagle viewing while learning about the characteristic of this national symbol and its amazing comeback from near extinction. Events are scheduled on Saturday and Sundays, with an occasional Friday event for schools (by special arrangement with the local Conservation Education Consultant). Dates and locations for these winter events are available in November.



Discover the *Discovery Center*

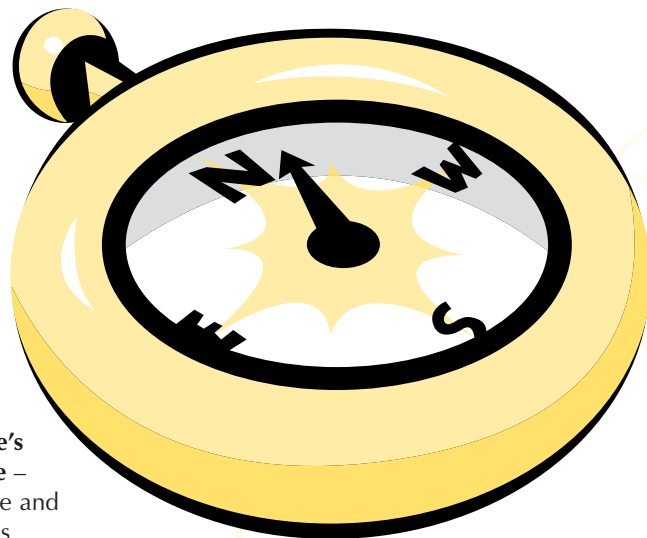
Discover ten acres of gardens, wetlands, walkways and wildlife that surround the Department of Conservation's newest education facility - the Discovery Center in Kansas City. A model of conservation practices the center features "Green Design" architect including a living machine waste water treatment system, environmentally friendly building materials and the use of recycled products.

Located in the heart of the urban core, the Discovery Center focuses its educational programs on helping urban youth and adults appreciate the bounty and beauty of nature, and learn outdoor skills such as hiking, camping, wildlife viewing and growing native plants. Knowledge and skills to enjoy, protect and enhance Missouri's natural heritage are acquired in six hands-on workshops. Registered groups can participate in:

Nature's Bounty – Learn ethics of hunting, fishing and harvesting wild edibles.

Nature's Garden – Use native plants for landscaping.

Exploring the Outdoors – Learn skills to enjoy hiking, birding and camping.



Nature's Palette –

Explore and express appreciation of nature through the visual arts.

Woodworking for Wildlife – Learn habitat requirements for wildlife and build nest boxes and feeders.

Nature's Aquarium – Study watershed models and perform water quality investigations.

The Discovery Center provides a unique educational experience as well as a quiet place of reflection for visitors to enjoy and appreciate nature's offerings.

Conservation *Frontiers*

Missouri Conservation Frontiers is a program to help young people and their adult leaders learn about Missouri's natural resources. Through a series of activities participants gain knowledge about the states' fish, forest, wildlife and water resources as well as ways to conserve and protect them.

By completing activities such as outdoor camping, tree identification, squirrel nest studies, water quality testing, litter pick-up, conservation photography and many more participants earn points. The points are "cashed" in for special Frontiers awards including a compass, Viewing Nature guide, flashlight and

backpack. The program guide lists over 120 eligible activities and 13 achievement levels, leading to recognition as a Missouri Conservationist. The wide range of activities is designed for individual accomplishment with some supervision.

This program is geared primarily for young people of Missouri along with adult leadership. Leaders must be at least 18 years of age. Families are especially encouraged to work together towards completion of the various levels of achievement. Youth groups, such as 4-H, Scouts, FFA, etc., will also find this program has a lot to offer.

WOW!

You'll exclaim "wow" when visiting the new American National Fish & Wildlife Museum: Wonders of Wildlife (WOW). Located in Springfield, the Wonders of Wildlife Museum opened its doors to the public in November 2001. The museum brings the heritage and future of conservation to life on a grand scale, with hundreds of fascinating, educational exhibits.

Visitor's can test their strength against that of a bald eagle, come face-to-face with river otters, bobcats and beavers, walk through the digestive system of a 32-foot largemouth bass, follow their own "fish" as it makes its way through a river current and hook their own blue marlin on an interactive video simulator. Wonders of Wildlife also offers

a replica Missouri cave – complete with bats, video "books" that tell the stories of American conservation heroes, free-roaming wild turkeys, and an interactive exhibit called "A Difference of One" where visitors can read and print out a checklist of things they can do every day to conserve our natural resources and protect our environment.

The Education program at the museum is run by the Missouri Department of Conservation. Beginning in 2003 education programs will be available at a new Education Center adjacent to the Museum. In the meantime, special group rates are available for classes wanting to tour the museum. Make plans now to take your students to this fabulous museum where they'll be WOWed by the stimulating experience while learning the importance of fish and wildlife resources.

Taking Action

Stream Teams

Empowering students to make a difference they can see in the real world takes learning to a whole new level.

Missouri Stream Team is a program to promote awareness and involvement in river and stream conservation. A working partnership of citizens who are concerned about Missouri streams, the Stream Team program provides an opportunity to get involved in hands-on conservation.

Stream Team provides training and information to better understand stream systems. Hands-on projects such as litter control, streambank stabilization, streamside tree planting, water quality monitoring, and storm drain stenciling give students ownership of aquatic resources and a stake in their conservation. Stream Team membership is free and we can help you plan a project of your own, or match you with an effort already under way.

You can adopt a stream, determine river values and problems, and plan projects based on your students' assessments. Technical assistance, instructional support and resource materials are readily available. Once you sign up, you're set to take action. Let your students take the lead on deciding what to do to improve their stream. A complete, scalable, multi-disciplinary curriculum keyed to current standards is available. Splash into action – join a Missouri Stream Team!

Forestkeepers

Are you looking for hands-on activities that challenge your students' science, math, natural history and observation skills . . . and will only cost you one cent? Then, the Missouri Forestkeepers Network may have what you are looking for.

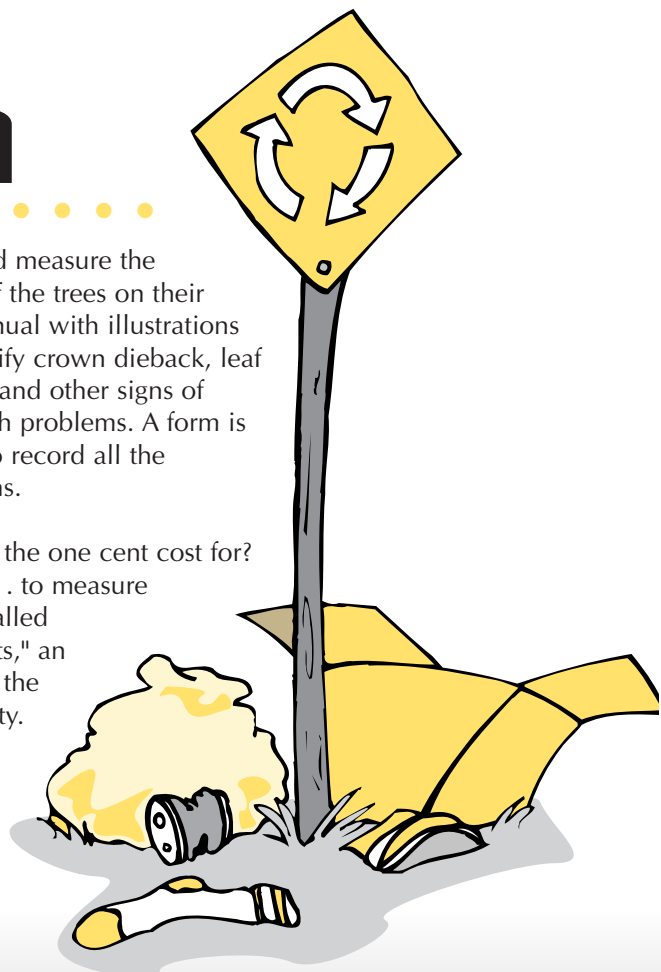
Forestkeepers is Missouri's citizen forest health monitoring program. It provides a statewide network for those interested in Missouri's forests an opportunity to learn about forest health and contribute to the conservation of the state's forests.

Open to individuals, youth groups, classrooms, families and forest landowners, volunteers in this program select a plot of trees to monitor and measure at least once a year. The plots are located on private woodlots, publicly-owned forests, school yards, city parks and along streets.

Enrollees receive a starter kit that provides the tools and information necessary for them to conduct their annual observations. A stick-on Biltmore scale has information to

identify and measure the diameter of the trees on their plot. A manual with illustrations helps identify crown dieback, leaf defoliators and other signs of forest health problems. A form is provided to record all the observations.

So, what is the one cent cost for? A penny . . . to measure what are called "penny plots," an estimate of the trees' density.



Cleaning up the Mighty MO

Teacher Packets & Field Trips

On October 6th, 2001 something changed on the Missouri River. That was the date of the first Missouri River Relief Project, the largest clean-up in the history of the River. Over 500 volunteers cleaned 36 miles of river. The results were astounding; an estimated 60 tons of debris was removed from the river and recycled. Two clean-up efforts will occur this year on the river near Jefferson City (September 28) and St. Charles (October 12). A Teacher Packet has been developed along with the establishment of an Educational Forum the day before each river clean-up. The Teacher Packet contains activities focusing on building a simple model watershed and selected natural history of the Missouri River from the perspective of the Lewis and Clark expedition. The Educational Forum is designed to provide an organized field trip experience for teachers and students involving a tour of part of the clean-up site, a visit to the trash barge and equipment, and a variety of educational activities.

To obtain a Teacher Packet and register for the Educational Forum contact Bryan Hopkins, at the Missouri Department of Natural Resources.

Education Resources Directory

Check out our web site for information about Conservation programs and services
<www.conservation.state.mo.us>

Central Office

P.O. Box 180,
Jefferson City, MO 65102-0180
573/751-4115

Office of Environmental Education, Central Office

Aquatic Resources Education Coordinator
Sam Faith, 573/751-4115 x 3175
faiths@mail.conservation.state.mo.us

Education Curriculum Coordinator
Vacant, 573/751-4115 x 3288

Environmental Education Coordinator
Syd Hime, 573/751-4115 x 3370,
himes@mail.conservation.state.mo.us

Forestry Education Coordinator
Bruce Palmer, 573/751-4115 x 3113
palmeb@mail.conservation.state.mo.us

Regional Offices

Northeast Regional Office
2500 S Halliburton
Kirkville, MO 63501
660/785-2424

St. Louis Regional Office
2360 Hwy D
St. Charles, MO 63304
836/441-4554

Southeast Regional Office
2302 County Park Dr
Cape Girardeau, MO 63701
573/290-5730

Central Regional Office
1907 Hillcrest Dr
Columbia, MO 65201
573/884-6861

Kansas City Regional Office
3424 NW Duncan Rd
Blue Springs, MO 64015
816/655-6250

Northwest Regional Office
701 NE College Dr
St. Joseph, MO 64507
816/271-3100

East Central Regional Office
375 S Hwy 185
Sullivan, MO 63080
573/468-3335

Ozark Regional Office
551 Joe Jones Blvd
West Plains, MO 65775
417/256-7161

Southwest Regional Office
2630 N Mayfair
Springfield, MO 65803
417/895-6880

West Central Regional Office
2010 S 2nd St
Clinton, MO 64735
660/885-6981

Conservation Education Consultants

Northeast Region

Karen Armstrong, 660/785-2420
armstk@mail.conservation.state.mo.us

St. Louis Region

Nancy Snider, 636/441-4554
sniden@mail.conservation.state.mo.us
Liz Lyons, 314/231-3803
lyonsl@mail.conservation.state.mo.us
David Bruns, 636/458-2236
brunsd@mail.conservation.state.mo.us

Southeast Region

Ben Russell, 573/290-5730
russeb@mail.conservation.state.mo.us

Central Region

Elaine Callaway, 573/635-9824
callae@mail.conservation.state.mo.us

Kansas City Region

Jane Rehner, 816/759-7300
rehrej@mail.conservation.state.mo.us
Pat Whalen, 816/759-7300
whalep@mail.conservation.state.mo.us

Northwest Region

Lisa Bonneau, 816/271-3100
bonnel@mail.conservation.state.mo.us
Greg Collier, 660/646-6122
collig@mail.conservation.state.mo.us

East Central Region

Steve Juhlin, 573/468-3335
juhlis@mail.conservation.state.mo.us

Ozark Region

Melanie Carden-Jessen, 417/256-7161
cardem@mail.conservation.state.mo.us

Southwest Region

Regina Knauer, 417/895-6880
knauer@mail.conservation.state.mo.us
Jeff Cantrell, 417/451-4158
cantrj@mail.conservation.state.mo.us

West Central Region

Steve Shupe, 660/885-6981
shupes@mail.conservation.state.mo.us

Nature Centers

Powder Valley Conservation Nature Center, Kirkwood, 314/301-1500

Burr Oak Woods Conservation Nature Center, Blue Springs, 816/228-3766

Springfield Conservation Nature Center, Springfield, 417/888-4237

Runge Conservation Nature Center
Jefferson City, 573/526-5544

August A Busch Memorial
Conservation Area, St. Charles
636/441-4554

Rockwoods Reservation, Eureka
636/458-2236

Discovery Center, Kansas City
816/759-7300
www.kcconservation.com

American National Fish & Wildlife
Museum: Wonders of Wildlife
Springfield, 417/890-9453
www.wondersofwildlife.org

Fish Hatcheries

Shepherd of the Hills, Branson
417-348-1305

Lost Valley Hatchery, Warsaw
660-438-4465

Blind Pony, Sweet Springs
660-335-4531

Chesapeake, Mt. Vernon
417-466-3421

Bennett Spring Lebanon
417-532-4418

Maramec, St. James
573-265-7801

Hunnewell
573-983-2201

Indian Trail, Salem
573-743-6215

Montauk, Salem
573-548-2585

Roaring River, Cassville
417-847-2430

Awesome Otters
Glenn Chambers
573/445-9773

Call of the Wild
Central Office
Ralph Duren
573/751-4115 x 3604

Conservation Frontiers
Central Office
573/751-4115 x 3808

**Environmental Education
Certification Program**
Central Office
573/751-4115 x 3370
www.meea.org

Forestkeepers
Central Office
573/751-4115 x 3608
Forest ReLeaf of Missouri
4207 Lindell Blvd., Suite 120
St. Louis, MO 63108
1-888-936-7378
www.forestkeepers.org.

Hunter Education
Regional Offices

Outdoor Skills: BOW and HOOT
Central Office
573/751-4115 x 3608
sloank@mail.conservation.state.mo.us

**Show-Me Missouri Fish Mobile
Aquarium**
Central Regional Office
573/884-6861
finlej@mail.conservation.state.mo.us

Stream Teams
Central Office
573/751-4115 x 3165
www.mostreamteam.org



Building Skills

HOOT in' It Up in the Outdoors

Have a HOOT and some outdoor fun through the Department's family oriented HOOT (Hands-On Outdoor Training) program. Children ages four and up along with their parents or adult chaperone experience up close, sometimes dirty and slimy adventures ranging from bass fishing and canoeing to Dutch oven cooking and gee-o-logy at this 3-day program held annually in the spring. An array of sessions are offered including Ozark Folk Medicine, Talkin' Turkey, Incredible Edibles, Map and Compass Basics, and Outdoor Photography to name a few. The objective of this program is to foster a basic understanding of conservation, safety and fun while enjoying the outdoors. Skilled instructors and enthusiastic participants set the stage for introducing youth and adults to outdoor activities that often become life long passions. In the process they learn how to protect and conserve our natural resources.

Ready Set - BOW!

Do you BOW? Would you like to BOW? The Department's Becoming an Outdoors-Woman (BOW) is a workshop focused on learning outdoor skills associated with hunting, fishing, and other outdoor pursuits. Held twice a year in the spring and fall this program is open to anyone 18 years or older. Activities run the gamut from aquatic ecology and fly tying to bow hunting and rifle marksmanship. Daring participants can also try their hand at alpine climbing, belly boating, cave exploring and kayaking. This program is for people who have never tried outdoor skill activities but would like an opportunity to learn them, for beginners who want to improve specific skills, or for those adventurous souls who are just looking for fun, challenging outdoor experiences. Sessions are led by trained professionals who integrate information about natural resources and conservation into the skill building instruction. Participants leave with a renewed sense of self-discovery, satisfaction in accomplishing new feats, camaraderie of new friends and on occasion a few new bumps and bruises.

SHOOT and Beyond

For those outdoor enthusiasts interested in putting newly acquired skills into practice the Department

offers an array of workshops focused on single outdoor activities. SHOOT (Supplemental Hands On Outdoor Training), an extension of the HOOT program, offers weekend workshops for youth and their adult partners on activities such as shooting sports and fly fishing. The Beyond Becoming an Outdoors Woman (BBOW) program, for people 18 years and over, offers opportunities ranging from deer and turkey hunts to Dutch oven cooking and small mouth bass fishing by canoe on southern Missouri Streams.

Offered throughout the year at various locations across the state SHOOT and Beyond programs provide a venue for putting outdoor skills to practical use. In addition they introduce participants to a variety of Conservation Areas while emphasizing the wise use and management of our natural resources.

Hunter Education

Hunter Education is dedicated to developing hunters who handle firearms safely, respect other people and their property, obey the law, practice good environmental ethics, and recognize the importance of hunting and the role it plays in the management of wildlife resources. Mandatory for all firearm hunters born after January 1, 1967, this education program consists of 10 hours of classroom work. Taught by skilled volunteers; classes cover firearms and ammunition, hunting traditions and ethics, safety, hunting responsibilities, and wildlife conservation. The courses are offered statewide and at various times throughout the year. This is a must do for all new hunters and a good refresher for those who are already in the field.



EE Calendar

Check It Out

<www.conservation.state.mo.us>
has up-to-date information on the
Department of Conservation's
educator workshops. There's
something for everyone!

October 11-13

Finding Your Way

Jerry J. Presley Education Center
7:00 pm Friday – 1:00 pm
Saturday

Help your students explore their world. Begin with the young student and see how the development changes as their experiences increase with age, from simple maps to detailed cartography. Learn to interpret information displayed on topographic maps and become familiar with compass orienteering. Contact MDC Education Consultant Karen Armstrong, 660/785-2420. Application deadline October 1.

October 17-19

Forest and Glade Ecology

Jerry J. Presley Conservation Education Center
7:00 pm Thursday - 3:00 pm
Saturday
Study the ecology and management of forests and

glades while experiencing classroom connections through hands-on activities. Hike through compass reading, tree growth, trigonometry, rotten logs, select cuts, forest critters, and more.

Receive "Project Learning Tree" training and curriculum guides and other resources. 1 hour graduate credit, SMSU. Contact MDC Education Consultant Steve Juhlin, 573/468-3335.

October 18

Operation Clean Water

St. Charles County Rivers and Stream Project
This special day for water quality monitoring will be a celebration commemorating the 30 year anniversary of the "Clean Water Act". Stream Teams in St. Louis and St. Louis County, Warren, Lincoln and St. Charles County are invited to get involved. Other volunteers are also welcome. Contact Gerry Boehm, 636/447-0522

October 18-19

WILD About Bats

Walter Woods C.A.
4:00 pm - 9:00 pm Friday and
8:00 am - 6:00 pm Saturday
It's "bat" time of year again

when things nocturnal and often misunderstood become symbols of the season. Learn how to use the fun, hands-on cross-curricular activities from the Project WILD Curriculum Activity Guide to encourage students to develop SMSU. Contact MDC Education Consultants Regina Knauer, 417/895-6880 or Jeff Cantrell, 417/451-4158.

October 19

Fall Energy Festival

10:00 am - 4:00 pm
Missouri Botanical Garden's EarthWays Home
Fun, interactive events for the whole family. Learn new ways to use clean and renewable energy technology and to save money! Contact Glenda Abney, 314/577-0288.

October 19-20

Forestry Education for Elementary Teachers

Poosey Conservation Area
1:00 pm-6:00 pm both days
Have fun experiencing several different forest types. Learn to identify native trees and shrubs. Get new ideas on how to introduce your students to an important resource, our forest. 1 hour graduate credit, NMSU. Contact MDC Education Consultant Greg Collier, 660/646-6122. Reservation deadline is October 11.

October 25-26

An American Legacy: The Lewis and Clark Expedition

Hannibal - La Grange College
6:00 pm – 9:00 pm Friday and
8:00 am – 5:00 pm Saturday
This course features an integrated curriculum-based approach to the significance of the contributions of the Lewis and Clark expedition to our American heritage. The material is for middle or junior high school levels. It is designed to be used at the same time by several educators teaching the Lewis and Clark expedition through a variety of disciplines. 1 hour graduate credit, SBU. Contact MDC Education Consultant Karen Armstrong, 660/785-2420. Reservation deadline is October 18.

October 26

Big River Rendezvous

St. Louis

Join the Big Rivers Rendezvous aboard the Tom Sawyer Riverboat on the Mississippi River. Explore and cruise up to the confluence of the Missouri and Mississippi Rivers while enjoying a great meal, Dixieland music, beautiful scenery, and lively conversation. Contact Larry Ruff, Greenway Network Inc., 636/949-2793.

November 2-3

New Uses for an Old Kettle—Cooking with Dutch Ovens

Jerry J. Presley Education Center

8:00 am Saturday – 12:00 pm
Sunday

It's time to bring out the Dutch Ovens and learn how to amaze your family and friends with delicious, easy-to-cook meals! After a brief session on Dutch oven basics, the rest of the workshop will involve hands-on learning. Participants will receive a notebook full of practical information and recipes. Contact MDC Outdoor Skills Specialist Jean Mayer, 417/895-6880. Reservation deadline is October 7.

December 7 & 8

Eagle Days

Squaw Creek
National Wildlife
Refuge

9:00 am - 4:00 pm

Events include live eagle programs, exhibits, activities, videos, and eagle viewing with spotting scopes placed on the refuge.

Refreshments & related merchandise will also be available on site to purchase. Contact the St. Joseph MDC office, 816/271-3100 or Squaw Creek Refuge, 660/442-3187.



Missouri Conference on Environmental Education

Connecting education and the environment is the goal of the Seventh Annual Conference on Environmental Education November 22-24, 2002 at Tan-Tar-A Resort, Osage Beach. Co-sponsored by the Department of Conservation and the Missouri Environmental Education Association (MEEA) this event highlights the best practices of teachers and non-formal educators making a positive difference in student achievement.

Following the theme "Stepping Stones - Linking Education and the Environment" conference workshops will illustrate a variety of ways natural resources, conservation and the outdoors can be integrated across the curriculum for early childhood to adult students. A sampling of the more than forty workshops being offered include: MAPping With Nature, Herps for High School, Reading Nature to Children, Lewis and Clark for Teachers, Pond Critters, and Jelly Bean Math.

Kim Stokely, Founder and Education Director of Adopt-A-Watershed, will deliver a keynote presentation along with two workshop sessions on place-based learning and assessing cultural competency. Kim bases her work on the principal that using the local environment as the context for learning enhances the student learning experience while promoting watershed stewardship.

The full package registration is \$150 for MEEA members and \$175 for non-MEEA members who sign up by November 1. A special \$85 fee is offered to full-time students. For more information and online registration go to <www.succeslink.org> or call (573) 751-4115 x. 3899.





CONSERVATION CURRICULUM

Hot off the Press!

In the following pages you will find conservation activities from some of the Department's newest curriculum. These materials, along with a multitude of others, are available free to educators in Missouri. They can be requested online at www.conservation.state.mo.us or by contacting your local MDC office and asking for a Conservation Education Materials Request Form. This issue features activities from:

Conservation Seeds:

A comprehensive conservation education program for Pre K -2. Includes a 336-page teacher activity book, seasonal posters and identification cards.

Prairie Habitat Pack:

Thematic unit about prairies for grades 3-4. Includes a teacher guide, student magazines, colorful posters and supplemental resources.

Amphibians and Reptiles:

A new teacher's guide on Missouri Herps with background information and multidisciplinary activities for junior and senior high school.

CONGRATULATIONS!!!

Sarah Williams of Brookfield, Missouri winner of the Missouri Best-of-Show in the 2002 Jr. Duck Stamp and Design Contest, went on to receive 3rd place at this year's National Contest.



Students in grades K-12 are invited to submit original artwork depicting Missouri's waterfowl to the state contest. Participation in this program promotes learning about wetlands, waterfowl and other aquatic resources. Information is sent to schools in early fall and submissions are due in early March.

The Missouri Department of Conservation has coordinated this program in the past. Starting with the 2002-03 school year the state program will be coordinated by the U.S. Fish and Wildlife Service. Please request information by contacting one of the following:

Tim Haller
Big Muddy Wildlife Refuge
4200 New Haven Road
Columbia, MO 65201
Tim_Haller@fws.gov

Charles E. Marshall
Squaw Creek National
Wildlife Refuge
PO Box 158
Mound City, MO 64470
Charlie_Marshall@fws.gov

Outside In

Each issue of "Conservation Curriculum" will have a component that can serve as a teacher guide to *Outside In*, the student insert of the *Missouri Conservationist* magazine. Issues correspond as follows:

August *Outside In*
October Conservation Curriculum

November *Outside In*
December Conservation Curriculum

February *Outside In*
February Conservation Curriculum

May *Outside In*
April Conservation Curriculum

Schools can request classroom sets (30 copies, 1 copy serves 5 students), of *Outside In* for up to 8 sets or 240 copies per school. Materials are sent to school librarians and teachers are encouraged to share classroom sets. You can order by writing: Missouri Department of Conservation, Missouri Conservationist Magazine, PO Box 180, Jefferson City, MO 65102-0180.

Nature Jar

From: *Conservation Seeds*; Missouri Department of Conservation

Did You Know?

The purpose of flowers is seed making. One flower can produce one or many seeds. Seeds are the plant's way of reproducing itself. This activity will expose children to different kinds of seeds and their purpose.

PreK-2

You'll Need:

- Collection bag for each child
- Glue, Crayons, Scissors, Tape, Markers
- Instant camera and film (optional)
- Large piece of paper
- Heavy paper, cardboard or plastic foam meat tray for each child

What To Do:

1. During outside self-selected activity time, ask children to gather seeds, berries, and other fruits to put into the container. Emphasize that none of these are for eating and must not be put into their mouths. Be certain that children do not collect poison ivy berries.
2. Make the collection available for children to explore, sort, compare and match the items.
3. As children work, talk about the purpose of seeds and how seeds come in pods, nuts and other fruits.

Questions You Might Ask:

- Why do plants make seeds?
- How are seeds dispersed or scattered?
- How do people use seeds?
- What foods do people eat that are seeds?

Supplementary Activities:

- A. *Art* – During self-selected activity time, provide materials for children to make seed and leaf collages.
- B. *Bulletin Board* – Display the posters *Common Missouri Trees* and *Show Me Trees*, available from the Missouri Department of Conservation. These posters illustrate the flowers, leaves and seeds that are produced by common Missouri trees.
- C. *Group* – Play “what’s missing” with several of the different kinds of seeds.
- D. *Nutrition* – Plan a “seed of the day” snack and serve a different type of seed each day, such as sunflower seeds, pumpkin seeds, peanuts, popcorn, etc.
- E. *Outside* – During outside self-selected activity time, encourage children to collect seeds and berries from weeds and trees. Compare these with commercial bird seed. Put the collected seed in a bird feeder and see what the birds prefer. Make a chart recording the children’s observations.
- F. *Science* – During self-selected activity time, display the nature jar in the classroom and let the children dump it out and match the seeds and fruits. Add a scale to the area so children can explore weights of the various items.



Grasslands Galore

From: *Prairie Habitat Pack*; Missouri Department of Conservation

Vocabulary:

Prairie, grassland, forbs, roots, decompose

Objectives:

Students will be able to:

- Define a prairie.
- Describe the uses people have for the prairie.
- Locate other prairies in the world.

Pre-Discussion Questions:

1. What is a prairie?
2. How did people use prairies in the past?
3. How do people use the prairie today?

Text:

The first Europeans to encounter the vast **grasslands** of central North America experienced a landscape unlike anything they had ever seen. They named these areas **prairie** after the French word for a grassy meadow. Prairies are diverse grasslands with an abundance of plants and animals that have adapted specifically for the prairie environment. At the time of European settlement, at least 15 million acres of prairie existed in Missouri, covering more than one-third of the state. Today, fewer than 90,000 acres (less than 1 percent of Missouri's original prairie) remain.

Different types of grasslands occur throughout the world. The North American grasslands, called prairie, were shaped by climate. Increased precipitation allows vegetation to grow thick and lush. Shortgrass prairie occurs near the Rocky Mountains, where rainfall is low. Tallgrass prairie grows on the eastern side of the Plains, with rainfall exceeding 30 inches annually.

Missouri's prairies are dominated by tall grasses with a diversity of wildflowers. Prairie wildflowers are called **forbs**. Many prairie plants

have very deep **roots**. These root systems are **decomposed** by microorganisms, creating very deep, rich soil. The prairie is the most altered ecosystem in the U.S. Within the past 150 years, humans have plowed the prairies, suppressed naturally-occurring wildfires and seeded the grasses that were not originally found on the prairie. Prairies form deep, rich soil and they were quickly plowed for growing crops. Settlers feared raging prairie wildfires (with good reason) and worked hard to suppress them. The introduction of barbed wire kept cattle confined and overgrazing eliminated many plant species. From settlement to the present, exotic plants or plants not native to Missouri have been introduced on the prairie. Some are extremely aggressive, choking out native species. Today, people still use the prairie for farming crops, such as wheat and corn, and for grazing cattle. Our rich prairie soils help feed the world.

The results of the alterations to prairie have been dramatic. In the absence of fire, trees have invaded the prairie, shading out sunlight essential to prairie plant growth. Habitat destruction threatens many species dependent on prairies. Eliminating large predators such as wolves and mountain lions has allowed populations of smaller furbearers such as raccoons, skunks and opossums to increase. The tremendous loss of prairie habitat and the disruption of the predator and prey relationships have made it very difficult for some grassland species to survive. Missourians should recognize the treasures held in prairies.

Have students complete the activity on the "Grasslands Around the World" copy page. Discuss the importance of grasslands around the world. Why do different animals exist in each type of grass land?

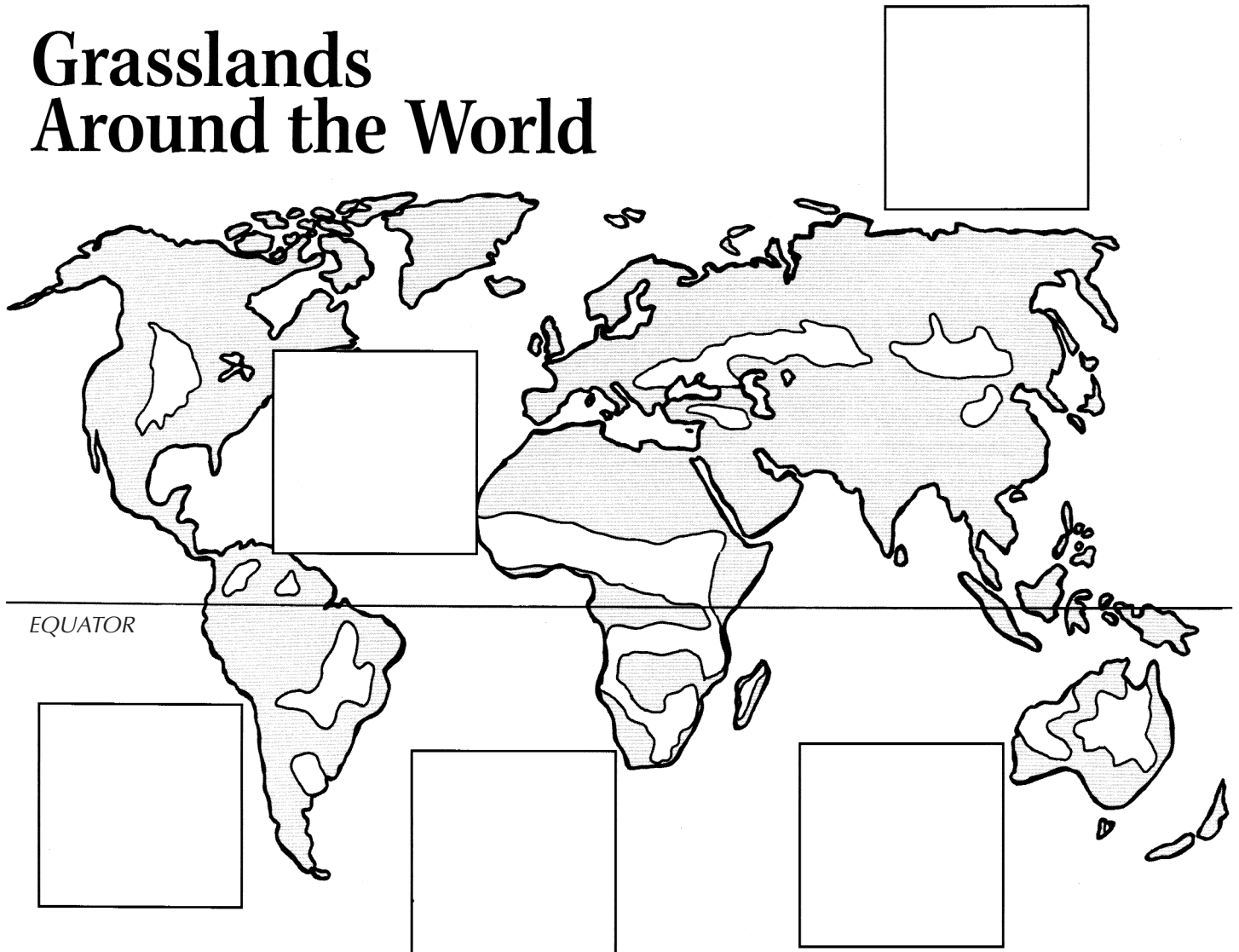
Post Discussion Questions:

What is a prairie? A grassland ecosystem where hundreds of plants, animals and other organisms make up a diverse community; not just grass like lawns or cow pastures.

Why should we care about the prairies? Answers may vary.

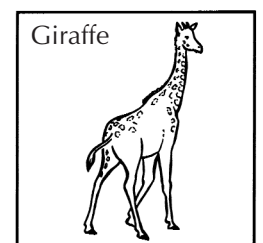
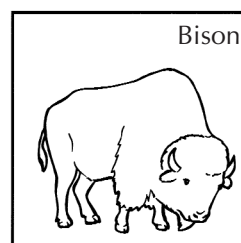
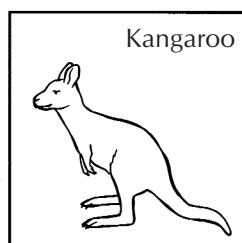
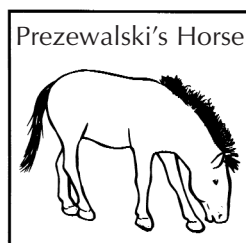
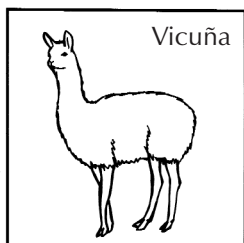


Grasslands Around the World



Grasslands are found all over the world. They have different names on each continent. Color the grasslands listed below and cut out the picture of the animal that lives in that grassland. Paste it on the map near where the animal lives.

1. PRAIRIES are the grasslands found in North America. Color the prairies GREEN.
2. PAMPAS are the grasslands found in South America. Color the pampas RED.
3. STEPPES are the grasslands found in Asia. Color the steppes BLUE.
4. VELDTS are the grasslands found in Africa. Color the veldts YELLOW.
5. SCRUBS are the grasslands found in Australia. Color the scrubs PURPLE.



5-8

Mole Crickets, Crawfish Frogs, & a few Prairie Oddballs

After researching a variety of prairie species your students can turn the information into newspaper classified ads and a game of “Who Am I.”

Materials:

Missouri Department of Conservation *Prairie: Life Among the Grasses* poster, prairie plant and animal identification guides, reference books

Background:

Diversity is a key descriptor of a prairie habitat. Animal species range from the minuscule prairie mound ant to the burrowing badger and the once abundant 2,000 pound bison. Plants dominate the landscape with grasses and forbs reaching heights of 7’ and boasting root systems extending 15’ down into the rich prairie soils. Among the prairie species are a few “oddballs” who have developed unique adaptations to aid in their survival in these grasslands habitats. Some of these include:

Grassland Crayfish	Northern Crawfish Frog
Round-winged Katydid	Prairie Mole Cricket
Ornate Box Turtle	Burrowing Owl
Narrow Mouth Toads	Short Eared Owls
Upland Sandpiper	Regal Fritillary Butterfly
Northern Harrier	Slender Glass Lizard
Great Plains Skink	Compass Plant
Royal Catchfly	Prairie Mound Ants

Procedure

Using the *Prairie: Life Among the Grasses* poster, which includes color drawings and descriptions of 38 species found in Missouri prairies, and other references have your students select a plant or animal from the list above (or other prairie species) and develop a characteristic profile. The profile should include descriptions of what type of prairie they live in, their population status in Missouri, physical characteristics, diet, preferred shelter, predators and unique adaptations. Use the research to complete the following activities.

Prairie For Rent:

Bring in a copy of the classified portion of a newspaper. Go over the parts of a classified ad for housing or apartments. Most ads give you information about the size of the home, positive attributes, how the home is unique, and where it can be found. For a prairie species looking for a home they

may be interested in what type of prairie is being offered and where it is located in the state. Food sources, population of predators and size of the prairie are all factors that may influence a species to call a part of the prairie home.

Once students are familiar with parts of a classified advertisement ad for a prairie that will suit the needs of the species they researched. When they are completed post the ads around the room. Assign a different species to each student and have them select the “house” ad that best meets their need. When everyone has found a home check with original ad writers to see if students are matched up correctly.

Adapted from: Cave for Rent, Missouri Department of Conservation

Who Am I?

Have students share their research with the rest of their classmates through a bulletin board display featuring pictures and profiles of each species or by compiling the research into a “Prairie Life” book for the entire class.

Form two equal teams. Each team chooses several of the prairie species. Using the profiles from the student’s research each team comes up with six to eight riddle clues for every species they’ve selected. The clues should be progressively easier, proceeding from the general to the specific.

When each team has their clues ready the action begins. Situate teams on opposite sides of the room. The teams take turns giving clues. Each team decides beforehand which members will give which clues. Team A gives the first clue; then team B tries to guess the identity of team A’s plant or animal. If they guess wrong nothing happens. Now team B gives its first clue and team A tries to guess the correct identity. This continues until one team successfully identifies the species being described.

Points can be awarded based on the number of clues needed to correctly identify the species. For example, if you are using eight clues and the opposing team guesses the correct identification with the first clue they are awarded 8 points, 7 points if they guess correctly on the second clue, 6 points for guessing with clue #3 and so on. Adjust accordingly when using six clues.

Adapted from: Animal Game, Sharing Nature with Children by Joseph Cornell

HOT OR COLD



9-12

Keeping Warm When You're Hot or Cold Blooded

From: *Amphibians and Reptiles, A Teacher's Guide*;
Missouri Department of Conservation

Overview:

In this exercise, students will investigate temperature preference by reptiles and will attempt to keep a thermometer in a specific temperature range by thermoregulating.

Objectives:

Students will be able to:

- Define thermoregulation, hibernation, and estivation (SC3)
- Describe how a reptile can regulate their body temperature (SC 4)
- Explain why different species of reptiles are better suited to specific climates (1.1, 1.2, 1.3)

Materials:

Copies of reptile temperature range and habitat information cards
Thermometer for each group of students

Introduction:

Amphibians and reptiles are ectothermic, i.e., their body temperatures depend entirely on external heat sources. This has also been called cold-blooded. The sun is the main heat source, but they may get heat from other sources. Just as important as getting heat is being able to get rid of heat when the animal gets too hot.

Each species has a range of body temperatures in which it can survive. However, within the survival range is a smaller range in which the normal body functions are carried out; this is the species activity temperature range. Even within this active range, many species have a smaller preferred or optimal temperature range that they try to maintain. In general, amphibians have lower activity temperature ranges than reptiles. Few reptiles have activity temperature ranges below 20°C.

Thermoregulation may involve behavioral, physiological or morphological mechanisms. Basking is the most visible behavioral mechanism. Timing of activity (night, day, morning), burrowing, climbing trees and submersion in water are additional examples of behavioral mechanisms. Physiological mechanisms for cooling by panting, salivation,

and urination or defecation on the body. To prevent cooling too quickly, reptiles and amphibians can reduce their heart rate and circulation to external body surfaces.

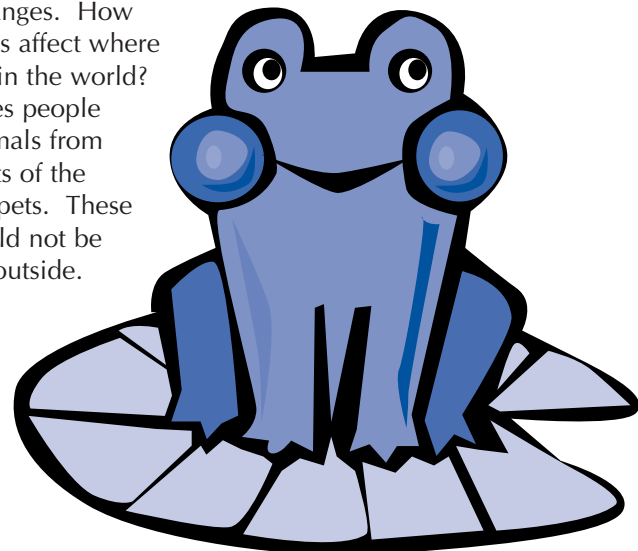
When conditions get too difficult for a reptile or amphibian to maintain body temperature, it can enter a time of dormancy or escape from the elements. Dormancy can be hibernation to avoid winter cold or estivation for all other situations (e.g., avoid extreme heat, avoid drought).

Procedure:

Can you keep a reptile warm?

(Adapted from Ranger Rick's Nature Scope activity.)

1. Pass out temperature cards (A cards) and thermometers.
2. Have pairs of students try to maintain the temperature range, on the card they received, for at least 10 minutes outside. They may have to do a variety of things with the thermometer to maintain that temperature range.
3. While the students are thermoregulating their thermometers, have them discuss ways that reptiles could maintain their body temperature in their preferred range (move to sun or shade, burrow, get in the water, climb a tree, etc.). How do reptiles survive the winter or the extreme heat of the desert?
4. Discuss when most reptiles hibernate in your area. Check average day and night temperatures for that time period.
5. Compare these dates and temperature data with known temperature ranges for reptiles and amphibians (see reptile temperature range cards B). Could these other reptiles survive in your area? How and in what part of the year.
6. Some of the reptiles/amphibians listed on the Reptile Temperature Range Cards have very broad temperature ranges and some have very narrow ranges. How would this affect where they live in the world?
7. Sometimes people keep animals from other parts of the world as pets. These pets should not be released outside. Why?



Temperature Range & Habitat Cards

(Zug, 1993)

a 12-15°C	a 16-19°C	a 20-23°C
a 24-27°C	a 28-31°C	a 32-35°C
a 36-39°C	a 40-43°C	B Mudpuppy (<i>Necturus maculosus</i>) 5-30°C Nocturnal/Aquatic
B Southern Redback salamander (<i>Plethodon cinereus</i>) 3-22°C Nocturnal/Terrestrial	B Cricket Frog (<i>Acris crepitans</i>) 8-35°C Diurnal/Terrestrial	B Timber Rattlesnake (<i>Crotalus horridus</i>) 13-33°C Nocturnal/Terrestrial
B Six-lined Racerunner (<i>Cnemidophorus sexlineatus</i>) 30-42°C Diurnal/Terrestrial	B Sea Turtle (<i>Dermochelys coriacea</i>) 22-32°C Diurnal/Aquatic	B Aldabra giant tortoise (<i>Geochelone gigantea</i>) 23-32°C Diurnal/Terrestrial
B Ornate box turtle (<i>Terrapene ornata</i>) 15-35°C Diurnal/Terrestrial	B American alligator (<i>Alligator mississippi- piensis</i>) 23-37°C Nocturnal/Aquatic	B Worm snake (<i>Carphophis amoenus</i>) 14-31°C Diurnal/Semifossorial

Meet the Projects

Need ideas on incorporating conservation and environmental education into your classroom? Want hands-on, interdisciplinary, fun activities that you can use to engage your students in critical thinking? Can you do all of this and meet state standards and district curriculum goals? The answer is YES! These curriculum and activity guides make it possible. Materials are distributed through educator workshops. Check the events calendar for one near you.

Project WILD assists learners in developing the skills needed to make informed decisions, exhibit responsible behavior and take constructive actions concerning wildlife and the environment. For more information contact Bruce Palmer, palmb@mail.conservation.state.mo.us.



Project Learning Tree materials bring the environment into the classroom and students into the environment. The program covers topics ranging from forests, wildlife, and water, to community planning, waste management and energy. In-depth high school modules include Focus on Forests, Forest Ecology, Solid Waste Management, and Risk Assessment. For more information contact Bruce Palmer, palmb@mail.conservation.state.mo.us.



Project WET (Water Education for Teachers) focuses on water resources as they relate to human needs and the natural world. Activities are centered on water as part of living and nonliving systems, quality, quantity, management and usage. For more information contact Joe Pitts, nrpittj@mail.conservation.state.mo.us.



Leopold Education Project uses the essays from Aldo Leopold's Sand County Almanac along with corresponding lessons to examine natural cycles, land use and environmental ethics. For more information contact Janice Green, JaniceGreene@smsu.edu.



Reference Materials

Listed below is a sampling of informational sheets profiling Missouri plants and animals that are available from the Department of Conservation. Useful for student research or classroom reference these profiles provide accurate, useful information. Single copies are available at no charge from the central office.

For a complete list contact your local Conservation office or visit the Departments web site at www.conservation.state.mo.us.

Beaver E220
Coyote E223
Mink E225
Mountain Lion E226
Squirrels E231
White-tailed Deer E232
Lizards of Missouri E213
Missouri Toads & Frogs E430
Missouri Turtles E468
Snakes of Missouri E448
Bald Eagles in Missouri E466
Bluebirds in Missouri Nat021
Greater Prairie Chickens E219
Missouri Owls E455
Common Trees of Missouri F054
Missouri Forests F016
Missouri Urban Trees F084
Oaks & Hickories F022
Prairie Forbs E469
Poison Ivy E439

Thanks! • • • • •

A round of applause and gratitude to those subscribers who took the time to respond to the reader survey included in the April 2002 issue of *The Resource*. Judging by your comments we're doing a good job with this newsletter! As with any project there is always room for improvement so we'll be applying your suggestions where we can. The overall goal is to produce a newsletter for educators that provides current, useful information and activities that integrate conservation and environmental education into the curriculum. If you have any ideas that can help us accomplish this goal please let us know.

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Mission Statement:

The Resource is published in October, December, February and April by the Office of Environmental Education. Its purpose is to provide current information on conservation and environmental education resources and events, professional development opportunities and suggestions for integrating environmental subjects into teaching.

For a free subscription or to submit information to the newsletter write to: Office of Environmental Education, Missouri Department of Conservation, P.O. Box 180 Jefferson City, MO 65102-0180.

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